

REMARKS/ARGUMENTS

Claims 1-6, 8-18, 20, 21, 25, 26, and 29-47 are pending in the present application. Withdrawn claims 3-6, 8-17 and 30-47 are cancelled. Claim 1 has been amended to indicate that the solid portion of the coating can optionally include d) a solid polyethylene glycol having an average molecular weight of from about 900 to about 10,000; and e) a fatty bisamide or fatty amide; and that the foam container has improved rim strength. Support for the amendment can be found at, for example, page 9, line 15 to page 10, line 12 and page 20, line 31 to page 21 line 6 of the specification. Eight claims (claims 1, 2, 18, 20, 21, 25, 26 and 29) are currently pending in the application.

New Claims 49-56 have been added. Support for the new claims can be found for example at page 10, lines 12-25 and Example 2, page 24, line 9-19 of the specification.

Applicants have carefully reviewed the Office Action of September 11, 2006. Reconsideration of the Examiner's rejection of the claims is respectfully requested.

Claim Rejection under 35 U.S.C. §102 (b)

Claims 1, 2, 18, 20, 21, 25, 26, and 29 stand rejected as being anticipated under 35 U.S.C. §102 (b) over JP 59067021 to Kitani (hereinafter "Kitani"). The Examiner asserts that Kitani teaches "expandable polystyrene particles for foam articles from molding coated with a coating composition comprising polyethylene glycol, polyethylene polyolefin wax and calcium stearate."

However, the exact wording in the abstract of Kitani reads "The non-solvent for styrene resin is esp. liq. paraffin, wax, polyethylene wax, 1-4C alkanol, ethylene-glycol, glycerine, stearic acid, Ca stearate, etc., or other

mixture." Kitani does not disclose the use of polyethylene glycol in the homogeneously-mixed organic solution.

The present invention according to the amended claims is directed to polystyrene particles containing a blowing agent that are coated with a coating composition that includes a liquid part and a solid part. The liquid part includes greater than 0.01% by weight based on the weight of the particles, of polyethylene glycol having an average molecular weight ranging from about 200 to about 800. The solid part includes greater than 0.01% by weight based on the weight of the particles, of polyolefin wax and greater than 0.01% by weight, based on the weight of the particles, of a metal salt of higher fatty acids.

In order to anticipate a claim, a prior art reference must disclose every limitation in the claim.

As Kitani discloses the use of ethylene glycol in coatings for EPS particles and does not disclose or in any way suggest using polyethylene glycol in such coatings, Kitani can anticipate the present claims.

As such, the rejection of claims 1, 2, 18, 20, 21, 25, 26, and 29 under 35 U.S.C. 102 (b) should be withdrawn.

Claim Rejections under 35 U.S.C. §103 (a)

Claims 1, 2, 18, 20, 21, 25, 26 and 29 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kitani (in the alternative); over JP 60-203648 to Matsui et al. (hereinafter "Matsui '648") in combination with either JP 60-203647 to Matsui et al. (hereinafter "Matsui '647") or JP 04-057837 to Ikeda et al. (hereinafter "Ikeda"); and over U.S. Patent No. 6,277,491 to Sakoda et al. (hereinafter "Sakoda") or JP 2002-338725 to Imai et al. (hereinafter "Imai") independently in combination with either of JP 53-109565 (hereinafter "JP '565"), JP 53-127567 (hereinafter "JP '567"), Matsui '647 or Ikeda.

The Invention

The invention, as now recited in the amended claims, particularly amended claim 1, relates to expandable polystyrene particles containing a blowing agent for forming a foam container in a molding process. These expandable polystyrene particles are coated with a coating composition consisting essentially of a liquid part and a solid part where the liquid part consists essentially of a) polyethylene glycol having an average molecular weight from 200 to 800; and the solid part consists essentially of b) a polyolefin wax, c) a metal salt of higher fatty acids selected from the group consisting of zinc, magnesium, calcium, and aluminum salts of stearic, lauric and myristic acid and optionally d) a solid polyethylene glycol having an average molecular weight of from about 900 to about 10,000; and e) a fatty bisamide or fatty amide.

The polyolefin wax of component b) is polyethylene wax with a particle size of about 6 microns to about 60 microns and an average molecular weight of about 650 to about 1000. Amended claim 1 further recites that the foam container is constructed to hold foods and liquids and that the coating composition improves at least the leakage resistance of the foam container relative to the foods and liquids and the rim strength of the foam container.

The rejection under 35 U.S.C. § 103(a) over Kitani

Kitani discloses immersing EPS particles in a mixture of solvent and non-solvent of the polystyrene resin for 30 minutes at 60° C prior to molding the EPS into a product. Representative solvent disclosed include n-heptane. Representative non-solvent is fluidic paraffin. It is required that the solvent and non-solvent, when they are mixed at 80 °C, dissolve each other and form a uniform phase. When pre-

expanding particles for a container, the pre-expansion is carried out with EPS particles covered by the mixture.

The objective in Kitani is to save energy while producing EPS molded product by reducing the heating temperature and time through such an arrangement where only the surfaces of EPS particles are modified so that they easily fuse and adhere by covering them with the mixture of solvent and non-solvent of polystyrene resin immediately before foam molding is carried out.

In the present invention, Applicants set out to improve at least the leakage resistance and rim strength of a foam container. In achieving this objective, Applicants discovered that coating EPS particles with a coating that consists essentially of non-solvents of EPS are used; specifically a liquid part consists essentially of liquid polyethylene glycol a solid part consists essentially of a polyolefin wax, a metal salt of higher fatty acids and optionally a solid polyethylene glycol and a fatty bisamide or fatty amide.

As amended, the present claims exclude the use of EPS solvents as are required by Kitani. The use of EPS solvents as disclosed by Kitani may save energy during the molding process as Kitani discloses, but this would be at the expense of the improved leakage resistance and rim strength of molded containers as is recited in the present claims.

In order to reject a claim under 35 U.S.C. § 103(a), the Examiner must establish a *prima facie* case of obviousness, meeting three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed

combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

In this case, Kitani requires the use of an EPS solvent, and there is no suggestion or motivation to prepare a coating without the EPS solvent. Further, reading Kitani would not provide a reasonable expectation of success to make containers having improved leakage resistance and rim strength as in the claimed invention. Finally, Kitani does not teach all of the claim limitations because EPS solvents are excluded in the presently claimed invention and, as indicated above, Kitani does not teach the use of polyethylene glycol as the liquid part of the coating, Kitani only teaches the use of ethylene glycol.

For all of the reasons set forth above, claims 1, 2, 18, 20, 21, 25, 26 and 29 are not obvious over Kitani and the rejection under 35 U.S.C. § 103(a) over Kitani should be withdrawn.

The rejection under 35 U.S.C. § 103(a) over
Matsui '648 in view of Matsui '647 or Ikeda

Matsui '648 discloses coating polystyrene resin beads containing a blowing agent using a composition containing silicone oil in the form of an aqueous emulsion and a surface modifier. The surface modifier is a mixture of a C₁₂₋₂₂ ester of a fatty acid and glycerin. The aqueous emulsion is prepared by dispersing 100 parts of silicone oil, 5-50 parts of a lipophilic cationic surfactant and 0-100 parts of polyethylene glycol in 100-400 parts of water.

The Examiner admits that Matsui '648 differs from the claimed invention in that the coating composition does not include polyethylene wax and a fatty acid metal salt. Applicants point out that Matsui '648 further includes

silicone oil and a lipophilic cationic surfactant, which are excluded from the claims as amended.

The Examiner puts forth Matsui '647 or Ikeda as providing the deficiency in the Matsui '648 disclosure suggesting that it would have been well known to one skilled in the art to incorporate both the polyethylene wax and fatty acid metal salt into the coating composition of Matsui '648.

Matsui '647 discloses coating EPS with a composition containing 0.01- 2 wt.% a metallic soap, either partial or complete ester from higher fatty acid and polyhydric alcohol and 0.005-0.2 wt.% silicone oil.

Ikeda discloses coating EPS particles with 0.005-0.05 wt.% polyethylene wax comprising a crystalline ethylene homopolymer having a mol. wt. of 400-900 and an m.p. of 85-110 °C.

In order to reject a claim under 35 U.S.C. § 103(a), the Examiner must establish a *prima facie* case of obviousness, meeting three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

In this case, Matsui '648 requires the use of silicone oil and a lipophilic cationic surfactant and does not disclose or suggest including polyethylene wax and a fatty acid metal salt in a coating for ESP particles. The examiner suggests that it would have been well known to include polyethylene wax and a fatty acid metal salt based on Matsui '647 and Ikeda,

however, Applicants assert that motivation to make the substitution is lacking. Further, there is no suggestion or motivation in Matsui '647 or Ikeda to remove the silicone oil and the lipophilic cationic surfactant to arrive at the claimed invention. The present invention provides coated EPS particles that make containers having improved leakage resistance and rim strength. The claimed coating composition provides the invention. Excluding materials or including extraneous materials interfere with the desired result. Thus, Matsui '648, even when combined with Matsui '647 and Ikeda, fails to suggest or motivate one skilled in the art to arrive at the invention of the amended claims.

Further, combining Matsui '648 with Matsui '647 and Ikeda would not provide a reasonable expectation of success to make containers having improved leakage resistance and rim strength as in the claimed invention.

Finally, the combination of Matsui '648 with Matsui '647 and Ikeda does not teach all of the claim limitations because silicone oil and the lipophilic cationic surfactant are excluded in the presently claimed invention as indicated above.

For all of the reasons set forth above, claims 1, 2, 18, 20, 21, 25, 26 and 29 are not obvious over Matsui '648 in view of Matsui '647 or Ikeda and the rejection under 35 U.S.C. § 103(a) should be withdrawn.

The rejection under 35 U.S.C. § 103(a) over Sakoda or Imai independently in view JP '565, JP '567, Matsui '647 or Ikeda

Sakoda discloses coating expandable thermoplastic resin beads with a composition containing a fluorine-containing block copolymer.

Imai discloses coating EPS particles with zinc stearate.

JP '565 and JP '567 each disclose coating EPS particles with a polyethylene wax.

Regarding Sakoda, the disclosure requires the use of a fluorine-containing block copolymer in the coating composition. The Examiner attempts to supplement the deficiencies in Sakoda based on the disclosures of JP '565, JP '567, Matsui '647 or Ikeda. However, none of these references provide any suggestion or motivation to prepare a coating without the fluorine-containing block copolymer. Further, combining the prior art references with Sakoda as the Examiner suggests would not provide a reasonable expectation of success to make containers having improved leakage resistance and rim strength as in the claimed invention. Finally, the combination of references suggested by the Examiner does not teach all of the claim limitations because Sakoda requires the use of a fluorine-containing block copolymer, which is excluded in the presently claimed invention.

For all of the reasons set forth above, claims 1, 2, 18, 20, 21, 25, 26 and 29 are not obvious over Sakoda with any combination of JP '565, JP '567, Matsui '647 or Ikeda and the rejection under 35 U.S.C. § 103(a) over this combination of references should be withdrawn.

Referring now to Imai, the Examiner has selected specific paragraphs from the disclosure to piece together a hypothetical coating composition for EPS particles that includes zinc stearate and polyethylene glycol. However, Imai discloses a host of potential ingredients in the disclosed coating composition including fatty acid amides, hardened castor oil, hardened soybean oil, higher aliphatic acid glycerides, glycerine, polyethylene glycol, aliphatic acid monoglyceride, and combinations. The Examiner has obviously used the present disclosure as a template and selectively picked ingredients from Imai even though a *prima facie* case of obviousness is not established when a reasonable expectation of success is not found in the prior art and the suggested combination is based on Applicants' disclosure.

An attempt is then made to bolster the *prima facie* case of obviousness by suggesting that it is "well known in the art to incorporate polyethylene wax into [a] coating composition for expandable polystyrene particles" with reference to JP '565 and JP '567. However, all that has been done is picking and choosing among five references to piece together the presently claimed composition, which amounts to impermissible hindsight.

Imai basically discloses that EPS particles can be coated with zinc stearate and any of a laundry list of potential other components from which the Examiner selected polyethylene glycol. The Examiner attempts to supplement the deficiencies in Imai based on the disclosures of JP '565, JP '567, Matsui '647 or Ikeda. However, none of these references provide any suggestion or motivation to modify the coating of Imai to a coating consisting essentially of a liquid part and a solid part, where the liquid part consists essentially of a liquid polyethylene glycol and the solid part consists essentially of polyolefin wax, a metal salt of higher fatty acids, and optionally a solid polyethylene glycol, a fatty bisamide or fatty amide, where the EPS coated particles provide improved leakage resistance and rim strength to foam containers. Further, combining the prior art references with Imai as the Examiner suggests would not provide a reasonable expectation of success to make containers having improved leakage resistance and rim strength as in the claimed invention. Finally, the combination of references suggested by the Examiner does not teach all of the claim limitations without using the present invention as a template for picking and choosing ingredients from the prior art to arrive at the present coating composition.

For all of the reasons set forth above, claims 1, 2, 18, 20, 21, 25, 26 and 29 are not obvious over Imai with any combination of JP '565, JP '567, Matsui '647 or Ikeda and the

rejection under 35 U.S.C. § 103(a) over this combination of references should be withdrawn.

Summary and Conclusion

The claimed invention, particularly that of amended, independent claim 1 and new independent claim 49, is not taught, disclosed, or even suggested in any of the cited references or in any combination of cited references. The dependent claims are patentable on their own merits in addition to being directly or indirectly dependent on a patentable claim 1.

Applicants, for the first time, have found that expandable polystyrene particles used in forming a foam container in a molding process and coated with the claimed coating composition of claim 1 including the particle size and molecular weight of the polyethylene wax are important features for the desired end result of improving at least the leakage resistance of foods and liquids through the foam containers and the rim strength of the foam containers which are made of these expandable polystyrene particles in a molding process.

Applicants assert that claims 1, 2, 18, 20, 21, 25, 26, 29 and 49-56 are in form for allowance and request that a Notice of Allowance be issued in the present application.

The inventorship remains as originally indicated.

Respectfully submitted,



Gary F. Matz
Attorney for Applicants
Reg. No. 45,504
412-490-4794 - Phone
412-490 - Fax
NOVA Chemicals Inc.
1550 Coraopolis Heights Road
Moon Township, PA 15108